ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

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Environmental Permitting, Regulations and Other Requirements Related to the Manufacture of Biodiesel

In recent years interest has increased in both large and small scale manufacture of biodiesel. The purpose of this fact sheet is to provide guidance relative to environmental permitting for manufacturers of biodiesel.

Background on Biodiesel Fuel

Biodiesel is a domestically produced, renewable fuel that can be used in place of petroleum diesel. Use of biodiesel reduces greenhouse gas emissions of carbon dioxide and particulate matter that are associated with major health impacts, including cancer. Biodiesel also reduces hydrocarbon emissions that contribute to the formation of ground level ozone, as well as carbon monoxide, a poisonous gas associated with fuel combustion. In addition to the environmental and health benefits of the fuel, biodiesel also helps reduce the country's dependence on foreign oil imports.

In the United States most biodiesel is made from soy oil, but it can also be made from other vegetable oils, including rapeseed (canola), palm tree, olive, peanut, safflower, sunflower, and castor, or it can be made from used cooking oil. Biodiesel is typically blended with petroleum diesel and designated by the acronym "BXX," where the "XX" represents the percent of biodiesel in the blended fuel. Biodiesel manufactured to meet the American Society for Testing and Materials (ASTM) D6751 specifications is registered as a fuel and fuel additive with the U.S. Environmental Protection Agency and meets clean diesel standards established by the California Air Resources Board.

Biodiesel can be used in most diesel engines with little or no modifications when used in a B20 or lower blend. Higher concentrations of biodiesel may require some minor changes to injection rates and vehicle timing, and may have a detrimental effect on natural rubber hoses and gaskets. Biodiesel can be blended with the new Ultra Low Sulfur Diesel as there is no sulfur in biodiesel. It has a higher lubricity than petroleum diesel, but can gel at a slightly higher temperature. Biodiesel can also be blended with or used in lieu of #2 heating oil.

For more information on the environmental, health, and energy security benefits of biodiesel, visit the U.S. Department of Energy's Clean Cities website at www.eere.energy.gov/cleancities/ or the National Biodiesel Board website at www.biodiesel.org.

Manufacturing Biodiesel

Biodiesel is manufactured in a number of ways. The following website provides an illustration of how biodiesel is typically made: www.biodieselcommunity.org/. In the Northeast, restaurant waste

grease is increasingly being used as the base material to produce biodiesel. There are two types of waste grease found in restaurants: "yellow grease" and "brown grease."

Restaurants may be more familiar with yellow grease, which is the material collected from food preparation before fats, oils or grease are washed or rinsed down the drain. Yellow grease includes fryolator grease, is recyclable, and may be processed into commercial products in addition to biodiesel, including animal feed and industrial lubricants. In New Hampshire, the recycling of yellow grease is regulated under NH Code Admin. Rules Env-Sw 100-2100 (*Solid Waste Rules*, www.des.nh.gov/rules/desadmin_list.htm#solid). Processed waste vegetable oil has been certified as a waste-derived product by DES and can be used as a substitute for No. 6 oil or as a feedstock for the manufacture of biodiesel (see www.des.nh.gov/sw/waste_derived.htm).

Brown grease is generated from grease trap waste and is commonly mixed with contaminants in need of removal. This material has commingled with wastewater and can be more difficult to handle and convert to other uses. Any recyclable product (such as biodiesel) generated from this feedstock may be subject to DES regulation through NH Code Admin. Rule Env-Wq 1600 (*Septage Management Rules*, www.des.nh.gov/rules/desadmin_list.htm#waterq).

Using yellow and brown grease provides a beneficial re-use of a material that might otherwise be disposed in landfills or be shipped elsewhere for biodiesel production. There is also a good deal of research being done to determine what oil crops could be grown in this climate on a commercially viable scale.

Regardless of the base material, production of biodiesel includes the handling and use of an alcohol (usually methanol) and a strong base (usually sodium hydroxide or potassium hydroxide, also known as lye). Environmental concerns that must be addressed include fugitive emissions of methanol, the ultimate disposal of the by-product glycerin, and the generation and disposal of wastewater containing free fatty acids that have a high biochemical oxygen demand, or BOD, that can remove oxygen from water bodies and harm aquatic life.

Environmental permitting of biodiesel manufacturing facilities may vary with the characteristics of individual plants. Specific considerations that biodiesel manufacturers should know relative to environmental permitting in New Hampshire are as follows.

Air Permitting

The most common manufacturing process for producing biodiesel includes the use of methanol, from which there is the potential for fugitive methanol emissions. NH Code Admin. Rule, Chapter Env-A 1400, *Regulated Toxic Air Pollutants*, regulates air toxics and is available on-line at www.des.nh.gov/Rules/air.htm.

Under this rule, sources must demonstrate that they comply with emission limitations for all regulated toxic air pollutants. An air permit may be required if a source can potentially exceed these limits. As an example, DES has evaluated several small (1,000 gallons per day of biodiesel production) facility plans, all of which use the base-catalyzed transesterification of oil with alcohol process. In these cases, all raw materials and waste products are stored in closed containers and the processing itself is a sealed process. All of these facilities were shown to be in compliance with Env-A 1400 without restrictions and, therefore, would not require an air permit. They would, however, need to maintain documentation on-site demonstrating compliance with Env-A 1400.

If a source evaluates its process and determines that it is in compliance with Env-A 1400 and do not need an air permit, it does not need to contact the DES Air Resources Division – it only needs to maintain documentation at its facility demonstrating compliance and make it available for DES's

review upon request. If a source is unsure how to evaluate compliance with Env-A 1400, they may contact the DES Air Resources Division (603) 271-1370 or the Small Business Technical Assistance Program (800) 837-0656 for assistance in compiling such a demonstration. Please note that there is a fee of $500 if a source wants DES to perform the evaluation and issue a letter stating that there is no permit required (see Env-A 702.02, *Application Fee for Air Toxics Reviews*).

It is worth noting that stationary fuel burning devices that meet any of the permitting thresholds in Env-A 607.01, *Specific Applicability for Temporary Permits*, will need to obtain an air permit prior to construction even if using biodiesel as the fuel. For use in evaluating permitting thresholds, biodiesel is considered "diesel fuel oil." For instance, a boiler rated at 12 million British thermal units per hour (MMBtu/hr) would meet the threshold of Env-A 607.01(a) and, therefore, require an air permit. For further information on device limitations and permitting requirements please contact the DES Small Business Technical Assistance Program (800) 837-0656 or the DES Air Resources Division (603) 271-1370.

Devices burning virgin fuel oil are exempt from the requirements of Env-A 1400. Fuels containing more than 10 percent non-virgin petroleum fuel (e.g., biodiesel or waste vegetable oil) are not considered virgin fuel oils under current regulations. Therefore, emissions of regulated toxic air pollutants from combusting fuels containing more than 10 percent non-virgin petroleum fuel are subject to Env-A 1400. There is limited data currently available and DES is researching how to evaluate stationary sources (e.g., boilers and stationary engines) for compliance with Env-A 1400. If you are planning on combusting B10 or greater in a stationary combustion device, please contact the Air Resources Division at (603) 271-1370. In addition, the Air Resources Division is actively seeking emission data for stationary sources burning biodiesel. If you have information that you think may assist the Air Resources Division, please contact us.

Permitting for Storage of Biodiesel, Spill Response and Cleanup

New Hampshire does not have rules regulating the storage of neat (pure) biodiesel either above or below ground because biodiesel is not considered to be a petroleum product, hazardous waste, or a wastewater. However, storage vessels for biodiesel/petroleum blend products (e.g., B20) are regulated under the applicable petroleum underground or above ground storage tank rules. For underground storage tanks (USTs), consult Env-Wm 1401 and see www.des.nh.gov/orcb/ustprog.htm. For above ground tanks (ASTs), consult Env-Wm 1402 and at www.des.nh.gov/rules/desadmin_list.htm#oil. Spill response and cleanup requirements for biodiesel/petroleum blend products are specified in Env-Wm 1600 and Env-Wm 1403, see www.des.nh.gov/rules/desadmin_list.htm#oil. Owners of USTs and ASTs may qualify for cleanup cost reimbursement, see www.des.nh.gov/orcb/costprog.asp. For more information, contact the DES Oil Remediation and Compliance Section at (603) 271-3644.

If brown grease is used as a feedstock for biodiesel, both the transportation of the grease and its treatment are regulated in accordance with DES's *Septage Management Rules,* NH Code Admin. Rule Env-Wq 1600 (see www.des.nh.gov/rules/env-wq1600.pdf). These rules regulate collection (vehicles including accidental releases) (Env-Wq 1605), holding or storage tanks (Env-Wq 1606), and facilities where processing and treatment of brown grease occurs (Env-Wq 1609). For more information, please contact DES's Residuals Management Section at (603) 271-3908 or www.des.nh.gov/wwe/septslud.htm.

Disposal of Wastewater via Subsurface Disposal System

The byproducts of the manufacture of biodiesel are not considered to be hazardous waste. However, most biodiesel manufacturing processes result in the generation of wastewater that is typically high in free fatty acids and glycerin, and has a high biological oxygen demand (BOD). If the wastewater is to be disposed of in a subsurface (septic) disposal system, the manufacturer must register the

discharge under the Underground Injection Control (UIC) Program using the registration form on-line at www.des.nh.gov/pdf/floorreg.pdf.

The subsurface system must also be evaluated to verify that the additional high strength wastewater discharges will be treated by the system. DES will review the registration and issue a findings document outlining what is necessary for compliance with subsurface disposal rules (NH Code Admin. Rule Env-Ws 1000) and the Groundwater Discharge Permitting and Registration Rules (Env-Ws 1500). For more information contact the DES Drinking Water and Groundwater Bureau at (603) 271-2513.

Surface Water Permitting

Wastewater discharged to surface water requires a National Pollutant Discharge Elimination System (NPDES) permit. To apply for an NPDES permit contact the U.S. Environmental Protection Agency at (617) 918-1545 and the DES Wastewater Engineering Bureau at (603) 271-3908.

The storm water runoff from biodiesel manufacturing facilities is also regulated under the NPDES permit program. EPA defines runoff from these facilities as "storm water associated with industrial activity" under the federal storm water permit program which requires coverage under the Multi-Sector General Permit (see http://cfpub2.epa.gov/npdes/stormwater/msgp.cfm).

Disposal of Wastewater via Sanitary Collection System

If an existing sanitary collection system is to be used for wastewater disposal, the manufacturer must seek a permit to discharge into a local system/treatment plant from the applicable municipality (or other owner/operator). This action must be taken to assure that the collection system and treatment facility can handle the volume and loading, and so that an appropriate disposal fee can be determined.

An Industrial Wastewater Indirect Discharge Request (IDR) application must be submitted to the DES Water Division, in accordance with Env-Ws 904.10. The IDR is submitted through the municipality **wastewater treatment facility** and must be approved before the discharge to the sewer can begin. For more information contact the DES Wastewater Engineering Bureau Industrial Pretreatment Section at (603) 271-2052.

Land Application of Wastewater and Glycerin

The rules for land application of certain wastes are referred to as the *Sludge Management Rules*, NH Code Admin. Rule Env-Ws 800 (sludge) and Env-Ws 1600 (septage). At the present time, these rules only apply to solids produced as a result of wastewater treatment and do not cover the glycerin and wastewater from a biodiesel manufacturing process. For more information, see www.des.nh.gov/wwe/septslud.htm or contact the DES Wastewater Engineering Bureau at (603) 271-3908.

Disposal of Glycerin

Glycerin is a byproduct in the manufacture of biodiesel and cannot be disposed of in subsurface (septic) system or sanitary sewers. Larger volume facilities often seek a market for the glycerin with manufacturers of soap-type products. If the glycerin does not contain any free liquids, it may be approved for disposal at permitted landfills. For further guidance on the disposal of glycerin, contact the DES Solid Waste Management Division at (603) 271-2925, and see www.des.nh.gov/SW/.

Fire, Building, Mechanical, Plumbing, Zoning Code Issues

The waste grease, methanol, and the final biodiesel product are all combustible. While fire codes are not specifically an environmental issue, it is prudent to remind manufacturers that any biodiesel manufacturing facility must be in compliance with local and state fire codes. Manufacturers should contact their local fire department, fire marshal, building official (i.e., code enforcement officer), and zoning administrator for assistance in determining compliance with all state and local codes.

Licensing for Import or Production of Biodiesel and Certification as a Commercial Transportation Fuel and Import Fees

There may be other licensing and certification requirements for manufacturers of biodiesel. This fact sheet is focused on environmental permitting and is not intended to represent all licensing and/or certification requirements. However, additional information is provided for identifying the extent of licensing and/or certification needs.

Importers or producers of biodiesel in New Hampshire need to be licensed by the NH Department of Safety (DOS), pursuant to RSA 260:36, RSA 259:21 and RSA 146-A:11-b as biodiesel is considered a "special fuel." State law requires all motor fuel sold and used in New Hampshire to be reported monthly per RSA 260:32, RSA 260:38, and RSA 146-A:11-b, IV. For more information relative to licensing requirements, contact the DOS Road Toll Bureau at (603) 271-2311, and see www.nh.gov/safety/divisions/administration/roadtoll/index.html. If biodiesel is dyed at the terminal or refinery, it is not subject to the Road Toll tax per RSA 260:38.

Biodiesel/petroleum blend products are subject to cleanup fund import fees under RSA 146-A ($0.00125 per gallon), and are subject to either RSA 146-D ($.015 per gallon) or RSA 146-E ($.01 per gallon) reimbursement fund import fees. RSA 146-D and RSA 146-E fees support storage facility owner reimbursement fund programs see www.des.nh.gov/orcb/costprog.asp. For more information, contact the DES Oil Remediation and Compliance Section at (603) 271-3644.

If a producer of biodiesel desires to sell the product commercially, the fuel must be a registered fuel by the EPA. Only biodiesel certifying to the ASTM D6751 standard has undergone this certification process to date. Further information regarding the EPA approval of fuel for use in commerce is at www.epa.gov/otaq/regs/fuels/ffarsfrms.htm.

In addition to federal fuel registration requirements, legislation (Senate Bill 522) has been passed by both the New Hampshire House of Representatives and Senate, and will require that all biodiesel sold in the state meet the ASTM D6751 fuel quality standard. This requirement is expected to be signed into law by summer 2008. The requirement is set to take effect on January 1, 2009. This fact sheet will be updated upon final disposition of this bill.